We Claim:

1. An electrotransport device for in vivo delivery of a charged agent through a body surface at a higher electrotransport agent delivery efficiency (E) defined by the agent delivery rate per unit of applied current; the device (10) having a donor reservoir (26, 46) containing the charged agent and having a delivery area, and having a source of electrical power (32) and a current controller (19, 40), the device (10) being characterized by:

the current controller (19, 40) being adapted to provide an applied pulsing current having a periodic current waveform, a pulsing frequency, and a duty cycle, the pulsing current applied to the reservoir (26, 46) and to the body surface, wherein an applied current density is defined by the applied pulsing current divided by the delivery area, and wherein the body surface exhibits a higher electrotransport agent delivery efficiency (E) when the applied current density is greater than or equal to a critical current density level (I<sub>c</sub>) and the applied pulsing current is applied for greater than or equal to a critical time period (t<sub>c</sub>).

- 2. The device of claim 1, wherein the agent delivery efficiency (E) is more stable when the applied current density is above the critical level (I<sub>c</sub>) and less stable when the applied current density is below the critical level (I<sub>c</sub>).
- 3. The device of claim 1, wherein the device (10) is adapted to be applied to intact human skin and the controller (19, 40) is adapted to provide an applied current density of at least about 40 µA/cm<sup>2</sup>.
- 4. The device of claim 1, wherein the agent is fentanyl and the controller (19, 40) is adapted to provide an applied current density of at least about 40 μA/cm² for at least about 10 msec.

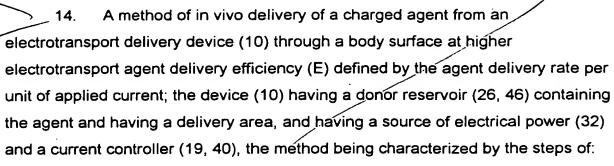
(

Hz.

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	1	5.	The device of claim 1, wherein the agent is goserelin and the controller	
	2	(19, 40) is a	dapted to vary and control the periodic current waveform to provide an	
	3	applied curr	ent density of at least about 50 µA/cm² for at least about 10 msec.	
	4			
	5	<b>6</b> .	The device of claim 1, wherein $t_c$ is at least 5 msec.	
	6			
	7	<b>7</b> .	The device of claim 1, wherein the periodic current waveform has a	
	8	current magnitude that provides a second applied current density less than Ic.		
	9			
	10	8.	The device of claim 7, wherein the second applied current density is	
	11	approximate	ely zero.	
O M	12			
M. C. W. M.	13	9.	The device of claim 7, wherein the controller (19, 40) is adapted to	
	14	vary the duty cycle and the agent delivery rate.		
	15	,		
	16	10.	The device of claim 7, wherein the controller (19, 40) is adapted to	
	17	vary the frequency and the agent delivery rate.		
	18			
	19	11.	The device of claim 1, wherein the donor reservoir contains at least	
	20	one suitable competitive specie.		
	21			
	22	12.	The device of claim 1, wherein the controller (19, 40) is adapted to	
	23	vary and control the frequency of the applied pulsing current to less than about 100		
	24	Hz.		
	25			
	26	13.	The device of claim 1, wherein the controller (19, 40) is adapted to	
	27	vary and cor	ntrol the frequency of the applied pulsing current to less than about 10	

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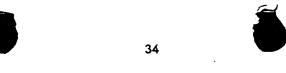
adapting the current controller (19, 40) to provide an applied pulsing current having a periodic current waveform, a pulsing frequency, and a duty cycle, the pulsing current applied to the reservoir (26, 46) and to the body surface, wherein an applied current density is defined by the applied pulsing current divided by the delivery area, and wherein the body surface exhibits a higher electrotransport agent delivery efficiency (E) when the applied current density is greater than or equal to a critical current density level (I<sub>c</sub>) and the applied pulsing current is applied for greater than or equal to a critical time period (t<sub>c</sub>).

- 15. The method of claim 14, wherein the agent delivery efficiency (E) is more stable at a current density above the critical level (I<sub>c</sub>) and less stable at a current density below the critical level (I<sub>c</sub>).
- 16. The method of claim 14, wherein the device is adapted to be applied to human skin, and the controller (19, 40) provides an applied current density at least about 40 μA/cm<sup>2</sup>.
- 17. The method of claim 14, wherein the agent is fentanyl, and the controller (19, 40) provides an applied current density of at least 40 μA/cm² for at least about 10 msec.
- 18. The method of claim 14, wherein the pulsing frequency is less than about 100 Hz.

AMENDED SHEET

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1	19.	The method of claim 14, wherein the pulsing frequency less than about	
2	10 Hz.		
3			
4	20.	The method of claim 14, wherein the duty cycle is less than about	
5	100%.		
6			
7	21.	The method of claim 14, wherein the body surface comprises intact	
8	human skin	and I <sub>c</sub> is at least about 40 μA/cm².	
9			
10	22.	The method of claim 14, wherein the agent is fentanyl, the body	
11	surface is intact human skin, and the applied pulsing current is equal to $I_{\mbox{\scriptsize c}}$ which is a		
12	least about 40 μA/cm², and wherein the pulsing current is applied for at least about		
13	10 msec.		
14			
15	23.	The method of claim 14, wherein the agent is goserelin, and the	
16	applied pulsing current is at least about 50 μA/cm², and wherein the pulsing current		
17	is applied for at least about 10 msec.		
18			
19	24.	The method of claim 14 further including the step of varying the duty	
20	cycle and the agent delivery rate.		
21			
22	25.	The method of claim 14 further including the step of varying the	
23	pulsing frequency and the agent delivery rate.		
24		•	

26. The method of claim 14 further including the step of adding a suitable competitive specie to the donor reservoir (26, 46).